

PROJECT TITLE : Unit Operations II
PERIOD COVERED : December 1st, 1980 - January 26th, 1981
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EXTRACTION OF STRIPS

The first trials with the rotocell extractor were carried out at different feedwater temperatures (Ref. 1).

The objective was to determine possible differences between the new equipment and the carousel extractor, rented and evaluated last year (Ref. 2).

In both cases the feedstock was the same Burley strip blend with the following nitrate nitrogen and ammonia nitrogen levels :

$\text{NO}_3\text{-N} = 0.55\%$

$\text{NH}_3\text{-N} = 0.41\%$

Temperatures from 14 to 90°C were tried and the following conditions were kept constant :

Extraction time : 40 min.

Input strips : 12 kg/h

Ratio strips to water: 1 : 10

The effect of the feedwater temperature on different extraction grades are shown on Appendix 1.

In general the trials showed similar results as received last year, however two differences can be noticed :

1) The extraction grade for ammonia nitrogen at low temperature is 60% with the new equipment versus only 50% with the carousel extractor.

2) The concentration of ammonia nitrogen of the extract exceeds the level of nitrate nitrogen at all temperatures.

The results obtained last year showed that the ammonia level started to exceed the nitrate level at 50°C. Ammonia seems to be more easily extractable.

DEWATERING OF STRIPS

The objective of the dewatering is the moisture reduction of the extracted strips by mechanical means.

Different equipment was tried (Ref. 3) and the following water reductions were found :

Water reduction
(%)

Miele Spin dryer	51
Fruit press	32
Make shift roller	28
Stem roller	13

The spin dryer and the fruit press work batch-wise.

Because of our goal to realize a continuous dewatering system, we will try to optimize the make shift roller.

APPLICATION OF THE EXTRACT ON THE STRIPS

For the moment we have tried two different systems of extract application.

One is to spray the denitrated extract on the extracted strips.

The other is to plunge the strips into the extract.

We will follow up both possibilities and finally choose the more suitable one for a continuous application.

DRYING OF THE STRIPS

Two different suppliers of drying equipment were contacted. For the time being none of them could offer a convenient system. Therefore different make shift arrangements were tried using gas heated air. We are now able to dry small quantities of strips batch-wise.

REFERENCES

- Ref. 1 : Rapport d'essais 101-116, J. Broisy } File rotocell
Analyses d'essais 101-116, J.-M. Chassot } extractor
- Ref. 2 : Monthly report, June 1980, Unit Operations II,
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- Ref. 3 : Notebook No. 2, R. Perrinjaquet, pages 11 + 12.

PROCESS DEVELOPMENT

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Effect of feedwater temperature on extraction grades of strips and on $\text{NH}_3\text{-N}$ and $\text{NO}_3\text{-N}$ concentration of the extract

Feedwater- temperature ($^{\circ}\text{C}$)	Extraction grades (%)			Concentration of the extract (g/l)	
	$\text{NO}_3\text{-N}$	$\text{NH}_3\text{-N}$	HWS	$\text{NO}_3\text{-N}$	$\text{NH}_3\text{-N}$
14	77	61	33	0.30	0.45
20	78	62	34	0.36	0.43
30	83	63	44	0.37	0.45
40	80	54	38	0.34	0.48
50	88	84	49	0.42	0.57
60	82	74	49	0.50	0.51
70	95	81	71	0.70	0.82
80	96	87	67	0.64	0.99
90	98	96	65	0.68	0.96

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